

REMARKS

Applicants thank the Examiner for the courtesy extended to Applicants' attorney during the interview held July 21, 2004, in the above-identified application. During the interview, Applicants' attorney explained the presently-claimed invention and why it is patentable over the applied prior art, and discussed other issues raised in the Office action. The discussion is summarized and expanded upon below.

The present invention relates to a processing solution for forming a hexavalent chromium free and corrosion resistant conversion film on zinc or zinc alloy plating layers, a hexavalent chromium free and corrosion resistant conversion film and a method for forming the hexavalent chromium free and corrosion resistant conversion film.

The rejection of Claims 11-12, 14-15 and 17 under 35 U.S.C. § 103(a) as unpatentable over U.S. 6,287,704 (Preikschat et al), is respectfully traversed.

As described in the specification beginning at page 1, line 14, it is known to form trivalent chromium-based corrosion resistant conversion films on zinc or zinc alloy-plated materials. One such method is that disclosed in JP 2000-509434, which is in the same patent family as, and thus equivalent in disclosure to, Preikschat et al. Applicants describe the following with regard to Preikschat et al beginning in the specification at page 2, line 11:

[Preikschat et al] discloses a method, which comprises the step of treating the surface of a metal using a plating bath comprising 5 to 100 g/L of trivalent chromium and nitrate residues, an organic acid and/or a metal salt such as a cobalt salt. This method uses, for instance, trivalent chromium in a high concentration and the plating operation is carried out at a high temperature. Therefore, this method is advantageous in that it can form a thick film and ensure good corrosion resistance. However, the method suffers from a problem in that it is difficult to stably form a dense film and that the method cannot ensure the stable corrosion resistance of the resulting film. Moreover, the processing bath contains trivalent chromium in a high concentration and also contains a large amount of an organic acid. This makes the post-treatment of the waste water difficult and results in the formation of a vast quantity of sludge after the processing. Although one can recognize that it is advantageous to use a processing solution free of any hexavalent chromium for ensuring the

environmental protection, the method suffers from a serious problem in that it may give a new burden to the environment such that the method generates a vast quantity of waste.

The inferiority of Preikschat et al's method is demonstrated in the comparative data in the specification herein. Comparative Example 3, which is described in the specification in the paragraph bridging pages 16 and 17, is identical to the cobalt-containing example of Preikschat et al, i.e., Example 3 therein. All the Examples and Comparative Examples were treated according to the processing steps described in the specification beginning at page 17, line 4, and evaluated for general corrosion resistance according to a salt spray test described therein. The results are shown in Table 5 at page 18 of the specification, reproduced below:

**Table 5: Results of Salt Spray Test (JIS-Z-2371) for Determining General Corrosion Resistance**

Ex. No.	Appearance of Film	Corrosion Resistance (1) (hr.)	Remarks
1	Pale Blue	240	30°C - 60 seconds
2	Pale Blue	300	30°C - 40 seconds
3	Pale Blue	300	30°C - 40 seconds
4	Pale Blue	300	30°C - 40 seconds
5	Pale Blue	300	30°C - 40 seconds
11	Milky White	Not less than 1000	Possessing Topcoat
12	Milky White	Not less than 1000	Possessing Topcoat
13	Milky White	Not less than 1000	Possessing Topcoat
1*	Reddish Green	240	25°C - 30 seconds
2*	Pale Blue	24	30°C - 40 seconds
3*	Purply Reddish Green	72	30°C - 40 seconds

(1) Time (hour) required for the formation of white rust (5% by mass).

\*: Comparative Example

As the data show, the corrosion resistance for the cobalt-containing embodiment of Preikschat et al is significantly worse than for the Examples herein.

Various Examples and Comparative Examples were subjected to a further salt spray test, as described in the specification at page 18, line 6. The results are shown in Table 6, at page 19 of the specification, reproduced below:

**Table 6: Results obtained in Salt Spray Test for Determination of Corrosion Resistance after Heating**

Ex. No.	Appearance of Film	Corrosion Resistance (1) (hr.)	Content of Co (2) (g/L)
6	Pale Blue	24	0.5
7	Pale Blue	240	1
8	Pale Blue	300	2
9	Pale Blue	360	4
10	Pale Blue	360	8
1*	Reddish Green	24	0
3*	Purply Reddish Green	48	1.0

(1) Time (hour) required for the formation of white rust (5% by mass).

(2) The cobalt content in the processing solution.

\*: Comparative Example

Compare the results for Example 7 and Comparative Example 3, each of which has the same cobalt content. The corrosion resistance of Comparative Example 3, i.e., Preikschat et al, is significantly less than that of Example 7. Finally, see the data in Table 7 at page 19 of the specification, reproduced below:

**Table 7: Contents of Zinc, Chromium, Cobalt and Oxalic Acid and Thickness of Films**

Ex. No.	Zn Content (mg/dm <sup>2</sup> )	Cr/(Cr+Zn) (mass ratio)	Co/(Cr+Co) (mass ratio)	C <sub>2</sub> O <sub>4</sub> /(C <sub>2</sub> O <sub>4</sub> +Cr) (mass ratio)	Film Thickness (μm)
6	1.50	25/100	5.7/100	9.1/100	0.07
7	1.50	25/100	12.3/100	19.4/100	0.08
8	1.50	25/100	20.6/100	28.6/100	0.08
9	1.50	23/100	30.8/100	43.0/100	0.09
10	1.50	21/100	36.5/100	46.7/100	0.09
1*	4.30	39/100	0.0/100	0.0/100	0.30
3*	2.20	31/100	2.9/100	0.0/100	0.10

\*: Comparative Example

Note that the thickness of Preikschat et al's film is greater than that of the examples, yet in general, provides inferior corrosion resistance.

The disclosure in Preikschat et al is considerably broader than the presently-claimed invention. For example, while the present invention requires cobalt, it is optional in Preikschat et al. In addition, many metals other than cobalt may be included (column 5, lines 20-26). Note, however, that Preikschat et al neither discloses nor suggests a way for further increasing the cobalt concentration of their conversion film. In addition, while Preikschat et al discloses that their chromium (III) complex preferably has chelate ligands which are selected from a large group of compounds which are inclusive of dicarboxylic acids, including, *inter alia*, oxalic acid (column 6, lines 1-21), the present invention requires oxalic acid. Preikschat et al neither discloses nor suggests that the presence of oxalic acid allows the cobalt concentration in the conversion film to increase by forming a salt with cobalt in the conversion film.

Nor obviously could one skilled in the art have predicted the above discussed comparative results with regard to Preikschat et al.

In response to the above arguments, the Examiner finds that "oxalic acid is the first choice, therefore, in order to demonstrate the criticality of the cobalt/oxalic acid as claimed, the applicants have burden to provide comparison results to compare the claimed cobalt/oxalic acid with cobalt/other representative chelate ligands" disclosed in Preikschat et al. In effect, the Examiner finds both a *prima facie* case of obviousness, and insufficient evidence to rebut that case.

In reply, and as Applicants' attorney pointed out during the above-referenced interview, when considering Preikschat et al as a whole, as the Examiner must do, it is clear that Preikschat et al is considerably broader than suggested by the Examiner. While oxalic acid is listed first in two particular sentences that list preferable chelate ligands (column 6,

lines 7-11 and lines 47-52), Preikschat et al contains similar disclosure with regard to preferable chelate ligands, which include dicarboxylic acids as well as other carboxylic acids (column 6, lines 12-21 and 54-64). In addition, in the disclosure relied on by the Examiner wherein oxalic acid is listed first, malonic acid is listed next, and also separately (column 6, lines 18-21 and lines 60-64). Indeed, in all the examples of Preikschat et al in which a dicarboxylic acid ligand is used, malonic acid is the **only** such acid exemplified (Examples 2-5). Moreover, not only is the ligand an optional component, but so is the non-chromium metal. While Preikschat et al lists cobalt compounds, Preikschat et al also lists compounds of metals selected from a group consisting of 36 metals in addition to cobalt (column 5, lines 21-26). In addition, Preikschat et al disclose various other optional components such as various ions other than carboxylic acid ions (column 5, lines 27-37), as well as other materials (column 5, lines 38-50). Thus, Preikschat et al is inclusive of thousands, if not more, of possible combinations of components. Indeed, Preikschat et al is so broad that it does not even present a *prima facie* case of obviousness. Compare *In re Baird*, 29 USPQ2d 1550 (Fed. Cir. 1994) (**copy enclosed**).

Nevertheless, even if such a case was presented, an Applicant's burden is to compare with the closest prior art. There can be no doubt that the closest prior art of Preikschat et al has already been compared to, i.e., Example 3 of Preikschat et al. It is the only example which contains cobalt, and it contains the clearly preferred dicarboxylic acid, i.e., malonic acid, because as discussed above, malonic acid is the **only** exemplified dicarboxylic acid. In addition, malonic acid differs from oxalic acid by containing a CH<sub>2</sub> moiety between the carboxyl groups. Of all the possible dicarboxylic acids listed in Preikschat et al, malonic acid is the closest structurally to oxalic acid.

For all the above reasons, it is respectfully requested that the rejection over Preikschat et al be withdrawn.

The rejection of Claims 11-17 under 35 U.S.C. § 103(a) as unpatentable over U.S. 4,349,392 (Huvar), is respectfully traversed. Huvar discloses an aqueous acidic solution and process for treating metal surfaces, particularly zinc and zinc alloy surfaces, for depositing a passivate film of improved clarity and hardness and to impart improved corrosion resistance thereto, wherein the solution contains effective amounts of chromium ions substantially all of which are in the trivalent state, hydrogen ions to provide a pH of about 1.2 to about 2.5, an oxidizing agent, a bath soluble and compatible organic carboxylic acid or metal salts thereof present in an amount to impart increased initial hardness and improved clarity to the passivate film and at least one additional metal ion selected from the group consisting of iron, cobalt, nickel, molybdenum, manganese, lanthanum, cerium, lanthanide mixtures as well as mixtures thereof, and the treating solution may optionally further contain halide ions and a wetting agent (Abstract). The Examiner finds that the organic carboxylic acid of Huvar is inclusive of oxalic acid. It is not. The structural formula at column 2, line 12ff excludes oxalic acid, which has the formula  $\text{HOOC-COOH}$ . Nor obviously could one skilled in the art have predicted the results obtained from the combination of oxalic acid and cobalt, wherein the oxalic acid allows the cobalt concentration in the conversion film to increase by forming a salt with cobalt in the conversion film.

In response to the above arguments, and as Applicants' attorney pointed out during the above-referenced interview, the Examiner has apparently misinterpreted Applicants' argument with regard to what Huvar discloses. Huvar requires a carboxylic acid of the formula  $(\text{OH})_a\text{R}(\text{COOH})_b$ , wherein a is an integer from 0 to 6, b is an integer from 1 to 3, and R is an alkyl, alkenyl, or aryl containing from  $\text{C}_1$  to  $\text{C}_6$  carbon atoms, as well as bath soluble and compatible salts thereof (column 2, line 12ff, and column 3, line 20ff). Since R must contain at least one carbon atom, it is clear that oxalic acid is excluded in Huvar. See also the list of applicable acids, which obviously does not include oxalic acid (column 6, lines 33-38).

Indeed, by excluding oxalic acid, Huvar actually teaches away from the presently-claimed invention.

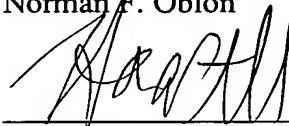
For all the above reasons, it is respectfully requested that this rejection be withdrawn.

The rejection of Claims 18-26 under 35 U.S.C. § 103(a) as unpatentable over Preikschat et al or Huvar, in view of the ASM Handbook (ASM Handbook), is respectfully traversed. ASM Handbook does not remedy any of the above-discussed deficiencies in Preikschat et al and Huvar. Accordingly, it is respectfully requested that this rejection be withdrawn.

All of the presently pending and active claims in this application are now believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Respectfully submitted,

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In re Baird (CA FC) 29 USPQ2d 1550

**In re Baird**

**U.S. Court of Appeals Federal Circuit  
29 USPQ2d 1550**

**Decided January 19, 1994  
No. 93-1262**

**Headnotes**

**PATENTS**

**1. Patentability/Validity -- Obviousness -- Relevant prior art -- Particular inventions  
(§ 115.0903.03)**

Application claim for flash fusible toner is not obvious in view of prior patent, even though generic diphenol formula of patent encompasses bisphenol A of claim, since disclosure of generic formula that may encompass claimed compound does not, without more, render compound obvious, and since generic diphenol formula of patent contains large number of variables and encompasses estimated 100 million different diphenols in addition to bisphenol, but patent does not suggest selection of specific variables to formulate that compound and specifically discloses diphenols which are different from, and more complex than, bisphenol A; prior patent's specific enumeration of derivatives of bisphenol A does not warrant contrary conclusion, since suggestion of certain complex bisphenol A derivatives does not describe or suggest bisphenol A itself and thus does not motivate its selection.

**Case History and Disposition:**



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Appeal from the U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences.

Patent application of Brian W. Baird, Art F. Diaz, William H. Dickstein and Charles M. Seymour, serial no. 07/333,524 (flash fusible toner resins). From decision upholding examiner's final rejection of claims 1-5 on ground of obviousness under 35 USC 103, applicants appeal. Reversed.

**Attorneys:**

John A. Brady, Lexington, Ky., for appellant.

Adriene B. Lepiane, assistant solicitor, PTO (Fred E. McKelvey, solicitor, and Richard E. Schafer, associate solicitor, with her on brief), for appellee.

**Judge:**

Before Michel, Plager, and Lourie, circuit judges.

**Opinion Text**

**Opinion By:**

Lourie, J.

Applicants Brian W. Baird, Art F. Diaz, William H. Dickstein, and Charles M. Seymour (collectively Baird) 1 appeal from the October 15, 1992 decision of the U.S. Patent and Trademark Office (PTO) Board of Patent Appeals and Interferences, Appeal No. 92-0860, affirming the examiner's final rejection of claims 1-5 of application Serial No. 07/333,524, entitled "Flash Fusible Toner Resins," as unpatentable on the ground of obviousness under 35 U.S.C. Section 103 (1988). We reverse.

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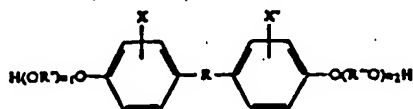
## BACKGROUND

Baird's application is directed to a flash fusible toner comprising a polyester of bisphenol A and an aliphatic dicarboxylic acid. Synthesis of the toner compositions involves the acetylation of bisphenol A and the reaction of that product with an aliphatic dicarboxylic acid selected from the group consisting of succinic acid, glutaric acid, and adipic acid. The application discloses that toners containing bisphenol A have optimal characteristics for flash fusing including, *inter alia*, high thermal stability and low critical surface energy.

Claim 1, the only claim at issue, reads as follows:

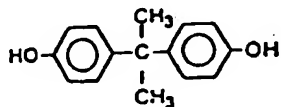
1. A flash fusible toner comprising a binder resin which is a bisphenol A polyester containing an aliphatic di [carboxylic] acid selected from the group consisting of succinic acid, glutaric acid and adipic acid.

Claim 1 stands rejected as obvious over U.S. Patent 4,634,649 to Knapp et al., which relates to developer compositions comprised of, *inter alia*, the polymeric esterification product of a dicarboxylic acid and a diphenol of the following generic formula:



wherein R is selected from substituted and unsubstituted alkylene radicals having from about 2 to about 12 carbon atoms, alkylidene radicals having from 1 to 12 carbon atoms and cycloalkylidene radicals having from 3 to 12 carbon atoms; R' and R'' are selected from substituted and unsubstituted alkylene radicals having from 2 to 12 carbon atoms, alkylene arylene radicals having from 8 to 12 carbon atoms and arylene radicals; X and X' are selected from hydrogen or an alkyl radical having from 1 to 4 carbon atoms; and each n is a number from 0 (zero) to 4.

Col. 4, lines 16-38. The Knapp formula contains a broad range of variables and thus encompasses a large number of different diphenols, one of which is bisphenol A, which is shown in Baird's application as having the following structure:



Knapp also discloses that the dicarboxylic acids have the general formula:

$\text{HOOCR}'''\text{n}_3\text{COOH}$  wherein R''' is a substituted or unsubstituted alkylene radical having from 1 to 12 carbon atoms, arylene radicals or alkylene arylene radicals having from 10 to 12 carbon atoms and  $\text{n}_3$  is a number of less than 2.

Col. 5, lines 6-14. Twenty typical dicarboxylic acids are recited, including succinic acid, glutaric acid, and adipic acid, the dicarboxylic acids recited in claim 1.

The examiner rejected claim 1 as obvious on the ground that Knapp specifically discloses as components of his esters the three dicarboxylic acids recited in claim 1 and a generic formula which encompasses bisphenol A. Recognizing that bisphenol A is defined when certain specific variables are chosen, the examiner reasoned that bisphenol A "may be easily derived from the generic formula of the diphenol in [Knapp] and all the motivation the worker of ordinary skill in the art needs to arrive at the particular polyester of the instant claim[ ] is to follow [that formula]."

The Board upheld the examiner's rejection. It rejected Baird's argument that there was no motivation for one to select bisphenol A from Knapp and summarily concluded that "the fact that [the claimed] binder resin is clearly encompassed by the generic disclosure of Knapp . . . provides ample motivation for the selection of [the claimed composition]." Slip op. at 3. The Board's decision was affirmed on reconsideration.

## DISCUSSION

The only issue before us is whether the record supports the Board's conclusion that, in view of the teachings of Knapp, the claimed compounds 2 would have been obvious to one of ordinary skill in the art. We review an obviousness determination by the Board *de novo*, while we review underlying factual findings for clear error. *In re Beattie*, 974 F.2d 1309, 1311, 24 USPQ2d 1040, 1041 (Fed. Cir. 1992).

Baird does not dispute the fact that the generic diphenol formula of Knapp encompasses bisphenol A. Nor does Baird dispute that Knapp specifically discloses the three dicarboxylic acids recited in claim 1. Rather, Baird argues that there is no suggestion in Knapp to select bisphenol A from the vast

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number of diphenols covered by the generic formula and that the Board thus erred in concluding that the claimed compounds would have been obvious.

[1] What a reference teaches is a question of fact. *Beattie*, 974 F.2d at 1311, 24 USPQ2d at 1041. The fact that a claimed compound may be encompassed by a disclosed generic formula does not by itself render that compound obvious. *In re Jones*, 958 F.2d 347, 350, 21 USPQ2d 1941, 1943 (Fed. Cir. 1992) (rejecting Commissioner's argument that "regardless [ ] how broad, a disclosure of a chemical genus renders obvious any species that happens to fall within it"). *Jones* involved an obviousness rejection of a claim to a specific compound, the 2-(2'-aminoethoxy)ethanol salt of 2-methoxy-3,6-dichlorobenzoic acid (dicamba), as obvious in view of, *inter alia*, a prior art reference disclosing a genus which admittedly encompassed the claimed salt. We reversed the Board's rejection, reasoning that the prior art reference encompassed a "potentially infinite genus" of salts of dicamba and listed several such salts, but

that it did not disclose or suggest the claimed salt. *Id.*

In the instant case, the generic diphenol formula disclosed in Knapp contains a large number of variables, and we estimate that it encompasses more than 100 million different diphenols, only one of which is bisphenol A. While the Knapp formula unquestionably encompasses bisphenol A when specific variables are chosen, there is nothing in the disclosure of Knapp suggesting that one should select such variables. Indeed, Knapp appears to teach away from the selection of bisphenol A by focusing on more complex diphenols, including 2,2-bis(4-beta-hydroxyethoxyphenyl) propane, 2,2-bis(4-hydroxypropoxyphenyl) propane, and 2,2-bis(4-hydroxyisopropoxyphenyl)propane. Col. 4, lines 51-64. Knapp teaches that in preferred diphenols, R has 2 to 4 carbon atoms and R' and R'' have 3 to 4 carbon atoms, and in "optimum" diphenols, R is an isopropylidene radical, R' and R'' are selected from the group consisting of propylene and butylene radicals, and n is one. Col. 4, lines 38-47. Knapp further states that the diphenol in the preferred polyester material is 2,2-bis(4-hydroxyisopropoxyphenyl)propane. Col. 5, lines 36-38. Fifteen typical diphenols are recited. None of them, or any of the other preferred phenols recited above, is or suggests bisphenol A.

The Commissioner repeatedly emphasizes that many of the diphenols specifically enumerated in Knapp are derivatives of bisphenol A. He argues that Knapp thus suggests the selection of bisphenol A itself. We disagree, because, according to the specification, the diphenol in the esters of claim 1 can only be bisphenol A, not a bisphenol A derivative. While Knapp may suggest certain complex bisphenol A derivatives, it does not describe or suggest bisphenol A and therefore does not motivate the selection of bisphenol A.

"[A] reference must be considered not only for what it expressly teaches, but also for what it fairly suggests." *In re Burckel*, 592 F.2d 1175, 1179, 201 USPQ 67, 70 (CCPA 1979). Given the vast number of diphenols encompassed by the generic diphenol formula in Knapp, and the fact that the diphenols that Knapp specifically discloses to be "typical," "preferred," and "optimum" are different from and more complex than bisphenol A, we conclude that Knapp does not teach or fairly suggest the selection of bisphenol A. *See In re Belle* 991 F.2d 781, 26 USPQ2d 1529 (Fed. Cir. 1993) (DNA sequence would not have been obvious in view of prior art reference suggesting a nearly infinite number of possibilities and failing to suggest why among all those possibilities one would seek the claimed sequence). A disclosure of millions of compounds does not render obvious a claim to three compounds, particularly when that disclosure indicates a preference leading away from the claimed compounds.

## CONCLUSION

The Board clearly erred in finding that Knapp would have provided the requisite motivation for the selection of bisphenol A in the preparation of the claimed compounds. Accordingly, the decision of the Board affirming the rejection of claim 1 as obvious over Knapp is reversed.

## COSTS

No costs. *REVERSED*

### Footnotes

Footnote 1. The real party in interest is Lexmark International, Inc.

Footnote 2. Since the toner, the resin, and the polyester compounds appear to be treated in the Board opinion and patent application as synonymous, and the PTO has premised its obviousness rejection on the obviousness of the compounds, we will treat this case accordingly.

- End of Case -